UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/027,397	12/19/2001	Linda J. Rankin	42390P12338	1176

7590 10/07/2005

John P. Ward
BLAKELY, SOKOLOFF, TAYLOR & ZAFMAN LLP
Seventh Floor
12400 Wilshire Boulevard
Los Angeles, CA 90025-1026

EXAMINER	
SONG, JASMINE	
ART UNIT	**PAPER NUMBER**
2188	

DATE MAILED: 10/07/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/027,397	RANKIN ET AL.	
	Examiner	Art Unit	
	Jasmine Song	2188	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *07 July 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-27* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-14 and 17-27* is/are rejected.

7)☒ Claim(s) *15-16* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Detailed Action

Specification

1. The lengthy specification has not been checked to the extent necessary to determine the presence of all possible minor errors. Applicant's cooperation is requested in correcting any errors of which applicant may become aware in the specification.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-14,17-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Liong et al., US Patent 6,151,649, in view of Anderson et al., US 6,598,123 B1.

Regarding claim 1, Liong teaches that a method comprising receiving a request to remove a hot plug module (it is taught as one of system nodes 104 and 106 is removed from the cluster system without causing failure or other SCSI termination related problems of the clustered system or other remaining node or nodes) from a running computing device (it is taught as the cluster system 301 as shown in Fig.3);

Liong does not teach updating a snoop filter of the running computing device, Liong provides a termination switch unit between each of the system nodes which

effectively isolates a down node form the rest of the cluster (Fig.3 and col.4, lines 41-51) and the downed node can be disconnected (that means stopping snooping the hot plug module) from the remainder of the clustered system without disturbing the SCSI bus line used by the other nodes (col.9, lines 21-24).

However, Anderson teaches updating a snoop filter of the multiple-processor systems (it is taught as replacing the entry in the snoop filter; Fig.1 and col.4, lines 35-42).

It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Anderson into Liong's computing system such as updating a snoop filter of the multiple-processor systems because the snoop filter filters unnecessary bus transactions by preventing them from reaching those nodes for which they are not needed, hence, a snoop filter can have a dramatic positive impact on the overall system performance by reducing bus traffic (col.1, lines 28-32).

According, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 7, Liong teaches that a midplane comprising

a plurality of couplers (it is taught as node side connection as shown in the Fig.3) to detachably couple hot plug modules (system nodes 104 and 106) to a running computing device (it is taught as the cluster system 301 as shown in Fig.3); and

a switch (it is taught as a terminator switch unit 340 and 342) to interconnect the plurality of couplers (see Fig.3) and to cease issuing snoop transactions to a coupler of the plurality of couplers associated with a hot plug module to be removed from the running computing device (it is taught as a termination switch unit between each of the system nodes which effectively isolates a down node form the rest of the cluster, see Fig.3 and col.4, lines 41-51; and the downed node can be disconnected (that means stopping snooping the hot plug module) from the remainder of the clustered system without disturbing the SCSI bus line used by the other nodes; col.9, lines 21-24).

Liong does not teach a snoop filter issuing snoop transactions, Liong provides a termination switch unit between each of the system nodes which effectively isolates a down node form the rest of the cluster (Fig.3 and col.4, lines 41-51) and the downed node can be disconnected (that means stopping snooping the hot plug module) from the remainder of the clustered system without disturbing the SCSI bus line used by the other nodes (col.9, lines 21-24).

However, Anderson teaches a snoop filter issuing snoop transactions and updating a snoop filter of the multiple-processor systems (it is taught as replacing the entry in the snoop filter; Fig.1 and col.4, lines 35-42).

It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Anderson into Liong's computing system such as a snoop filter issuing snoop transactions and updating a snoop filter of the multiple-processor systems because the snoop filter filters unnecessary bus transactions by preventing them from reaching those nodes for which they are not needed, hence, a

snoop filter can have a dramatic positive impact on the overall system performance by reducing bus traffic (col.1, lines 28-32).

According, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 17, Liong teaches that a computing device comprising,

a memory (Fig.3, memory within system nodes 104 and 106),

a hot plug module (it is taught as one of the system nodes 104 and 106) comprising a coupler (it is taught as node side connection) and one or more caching agents (combination of processor and controller as shown in the system node 104); a midplane (Fig.3, the combination of terminator switch unit and node side connection) comprising a plurality of couplers (it is taught as node side connection) to detachably couple hot plug modules (it is taught as system nodes 104 and 106) to a running computing device (it is taught as cluster system 301); and a processor coupled to the hot plug module via the midplane (see Fig.3).

Liong does not teach that one or more caching agents having cached lines of the memory and a snoop filter to track the cached lines of the one or more caching agents and cause the snoop filter to mark the one or more caching agents as invalid snooping agents in response to a request to remove the hot plug module. Liong provides a termination switch unit between each of the system nodes which effectively isolates a

down node form the rest of the cluster (Fig.3 and col.4, lines 41-51) and the downed node can be disconnected (that means stopping snooping the hot plug module) from the remainder of the clustered system without disturbing the SCSI bus line used by the other nodes (col.9, lines 21-24).

However, Anderson teaches a snoop filter to track the cached lines of the one or more caching agents and cause the snoop filter to mark the one or more caching agents as invalid snooping agents in response to a request to remove the hot plug module and updating a snoop filter of the multiple-processor systems (it is taught as replacing the entry in the snoop filter; Fig.1 and col.4, lines 35-42).

It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Anderson into Liong's computing system such as a snoop filter to track the cached lines of the one or more caching agents and cause the snoop filter to mark the one or more caching agents as invalid snooping agents because the snoop filter filters unnecessary bus transactions by preventing them from reaching those nodes for which they are not needed, hence, a snoop filter can have a dramatic positive impact on the overall system performance by reducing bus traffic (col.1, lines 28-32).

According, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claims 13 and 22, Liong teaches a hot plug module and a request to remove a hot plug module fro a computer device (it is taught as one of system nodes 104 and 106 is removed from the cluster system without causing failure or other SCSI termination related problems of the clustered system or other remaining node or nodes) from a running computing device (it is taught as the cluster system 301 as shown in Fig.3);

Liong does not teach a snoop filter comprising storage to store coherency information for lines cached by caching agents and update the coherency information, Liong provides a termination switch unit between each of the system nodes which effectively isolates a down node form the rest of the cluster (Fig.3 and col.4, lines 41-51) and the downed node can be disconnected (that means stopping snooping the hot plug module) from the remainder of the clustered system without disturbing the SCSI bus line used by the other nodes (col.9, lines 21-24).

However, Anderson teaches a snoop filter comprising storage to store coherency information for lines cached by caching agents and updating a snoop filter of the multiple-processor systems (it is taught as replacing the entry in the snoop filter; Fig.1 and col.4, lines 35-42).

It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Anderson into Liong's computing system such as employing a snoop filter comprising storage to store coherency information for lines cached by caching agents and updating a snoop filter of the multiple-processor systems because the snoop filter filters unnecessary bus transactions by preventing them from

reaching those nodes for which they are not needed, hence, a snoop filter can have a dramatic positive impact on the overall system performance by reducing bus traffic (col.1, lines 28-32).

According, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 2, Anderson further teaches that updating comprises updating the snoop filter to indicate that the hot plug module is no longer a valid snooping agent (it is taught as presence vector is updated to 1000 to indicate that only node #3 has the line cached, node #0 is no longer a valid snooping agent, col.3, lines 63-65).

Regarding claim 3, Anderson further teaches that updating comprises updating a valid vector (col.3, lines 63-65).

Regarding claim 4, Anderson further teaches that updating comprises disabling the snoop filter associated with the hot plug module (it is taught as a back invalidate, col.1, lines 60-66).

Regarding claim 5, Anderson further teaches that updating comprises marking all cache lines tracked by the snoop filter as not being present in the hot plug module (col.3, lines 38-53).

Regarding claim 6, Anderson further teaches that updating comprises updating presence vectors to indicate that associated cache lines are not present in the hot plug module (col.3, lines 63-65).

Regarding claim 8, Liong teaches the claimed invention as shown in claim 7, Liong does not teach that the switch causes the hot plug module to be removed to write modified cache lines to a memory of the running computing device. Anderson teaches that the switch causes the hot plug module to be removed to write modified cache lines to a memory of the running computing device (it is taught as updating and replacing the entry in the snoop filter; Fig.1 and col.4, lines 35-42).

It would have been obvious to the ordinary skill in the art at the time the invention was made to utilize the teachings of Anderson into Liong's computing system such as updating a snoop filter of the multiple-processor systems and replacing the entry in the snoop filter because the snoop filter filters unnecessary bus transactions by preventing them from reaching those nodes for which they are not needed, hence, a snoop filter can have a dramatic positive impact on the overall system performance by reducing bus traffic (col.1, lines 28-32).

According, one of ordinary skill in the art would have recognized this and concluded that they are from the same field of endeavor. This would have motivated one of ordinary skill in the art to implement the above combination for the advantages set forth above.

Regarding claim 9, Anderson teaches that the switch comprises a valid vector (it is taught as presence vector of node #0, col.3, lines 54-65) and the switch issues snoop transactions only to couplers that the valid vector indicates are associated with valid snooping agents (col.3, lines 54-65).

Regarding claim 10, Anderson teaches that the switch comprises presence vector associated with cache lines of the hot plug module to be removed (it is taught as Node #0), and the switch updates the presence vectors to indicate that the hot plug module does not have copies of the associated cache lines (col.3, lines 62-65).

Regarding claim 11, Anderson teaches that the switch comprises a different snoop filter for each coupler of the plurality of couplers and the switch disables the snoop filter for the coupler associated with the hot plug module to be removed (it is taught as a back invalidate, col.1, lines 60-66).

Regarding claim 12, Anderson teaches that further comprising another switch to interconnect the plurality of couplers, wherein the switches collectively track states of

cache lines of hot plug modules coupled to the couplers (col.3, lines 40-42) and cease to issue snoop transactions to the coupler associated with the hot plug module to be removed (it is taught as stopping snooping the node #0 since it is invalid).

Regarding claim 14, Anderson teaches further result in the computing device updating the valid vector in response to a hot plug removal request (col.3, lines 62-65).

Regarding claim 18, Liong teaches that the hot plug module comprises a mechanism to generate the request to remove the hot plug module (col.4, lines 41-51).

Regarding claim 19, Liong teaches that the memory comprises a plurality of instructions that in response to being executed result in the request to remove the hot plug module being generated (Fig.3).

Regarding claim 20, Anderson teaches that the one or more caching agents comprises a processor and one or more associated memory caches (Fig.1).

Regarding claim 21, Anderson teaches that the one or more caching agents comprises an input/output hub and one or more associated memory caches (Fig.1).

Regarding claim 23, Anderson teaches that the controller further updates the coherency information in response to a request to add a hot plug module to the computing device (col.3, lines 62-65).

Regarding claim 24, Anderson teaches that the controller updates the coherency information to indicate that the hot plug module is no longer a valid snooping agent in response to the request to remove the hot plug module (col.3, lines 62-65).

Regarding claim 25, Anderson teaches that the controller updates a valid vector of the coherency information to indicate that the hot plug module is no longer a valid snooping agent in response to the request to remove the hot plug module (it is taught as node #0 is not a valid node after the presence vector is updated).

Regarding claim 26, Anderson teaches that the controller updates the coherency information by marking all tracked cache as not being present in the hot plug module in response to the request to remove the hot plug module (col.3, lines 38-53).

Regarding claim 27, Anderson teaches that the controller updates the coherency information by updating presence vectors to indicate that associated cache lines are not present in the hot plug module in response to the request to remove the hot plug module (it is taught as presence vector is updated to 1000 to indicate that only node #3 has the line cached, node #0 is no longer a valid snooping agent, col.3, lines 63-65).

Allowable Subject Matter

4. Claim 15-16 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

5. When responding to the office action, Applicant is advised to clearly point out the patentable novelty which he or she thinks the claims present in view of the state of the art disclosed by the references cited or the objections made. He or she must also show how the amendments avoid such references or objections. See 37 C.F.R. 1.111 (c).

6. When responding to the office action, Applicants are advised to provide the examiner with the line numbers and page numbers in the application and/or references cited to assist examiner to locate the appropriate paragraphs.

7. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jasmine Song whose telephone number is 571-272-4213. The examiner can normally be reached on 8:00-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mano Padmanabhan can be reached on 571-272-4210. The fax phone numbers for the organization where this application or proceeding is assigned are 571-273-8300.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-3900.

Jasmine Song

Patent Examiner

September 30, 2005

FOR
Mano Padmanabhan

Supervisory Patent Examiner

Technology Center 2100

GARY PORTKA
PRIMARY EXAMINER